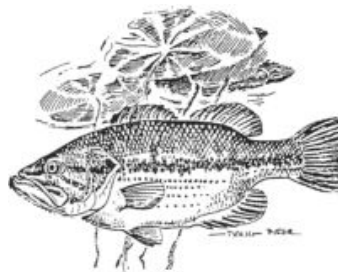


BUFFALO TRACE LAKE

2004 Fish Management Report

Larry L. Lehman
Fisheries Biologist

Clinton R. Kowalik
Assistant Fisheries Biologist



FISHERIES SECTION
INDIANA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
I.G.C. South, Room W273
402 West Washington Street
Indianapolis, Indiana 46201

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INTRODUCTION

Buffalo Trace Lake is a shallow 29-acre impoundment located within Buffalo Trace Park approximately ½ mile east of Palmyra on U.S. 150 in Harrison County. The park is maintained and operated by the Harrison County Parks and Recreation Department (HCPRD), which provides camping, swimming, picnic areas, shelter houses, sports facilities, a 1.3 mile-long fitness trail, boat rentals, and a concrete boat ramp.

This lake was constructed in 1971 and the Indiana Department of Natural Resources (IDNR) became responsible for managing the fish populations. The IDNR's Division of Fish and Wildlife (DFW) stocked the lake with largemouth bass in 1971 and bluegill in 1972. To provide anglers with more fishing diversity, channel catfish were introduced into the lake by the DFW in 1977. Regular supplemental stockings of catfish have been continued to maintain the channel catfish population, which was not expected to sustain itself through natural reproduction. Prior to this survey, 9,786 catfish had been stocked by the DFW from 1977 through 2003. An introductory stocking of redear sunfish was made in 1996 to provide additional panfishing opportunities.

In 1992, the HCPRD was given permission by the IDNR to stock triploid grass carp to control excessive amounts of submersed aquatic vegetation. Members of the pondweed and naiad families were the principal problem plants. Based on an estimate that 26 acres of the lake were infested with plants in the summer time, it was recommended that 390 grass carp (8 to 12 inches) be stocked. That stocking was carried out in November 1992.

A DFW fisheries survey in 1995 found that largemouth bass were stockpiled under the 14-inch minimum size limit, which had been in effect since 1985. To correct that situation, a 12 to 15-inch slot size limit was placed on the largemouth bass of Buffalo Trace in the summer of 1996. Under this regulation, anglers are allowed to harvest bass less than 12 inches or more than 15 inches in length, while bass in the 12 to 15-inch slot limit are protected from harvest. The harvest of surplus small bass should improve the growth and size distribution of remaining bass and prevent the decline of bluegill fishing.

Survey data from 1998 suggested that anglers were harvesting small bass as hoped. Largemouth bass abundance had declined compared to 1995 and bass growth had improved. Bluegill numbers had increased compared to 1995 and bluegill were providing good panfishing opportunities. It appeared that the slot limit was beginning to bring about positive changes in

the bass and bluegill populations. It was recommended that the 12 to 15-inch slot limit stay in place (Lehman 1999).

A survey was conducted in 2003 to evaluate the fish populations since the last survey in 1998. It included work in the spring to estimate the number of largemouth bass in the lake according to procedures outlined by Pearson (1990) and a fish management survey in June to collect more information on largemouth bass as well as the other fish species present in Buffalo Trace. The 2003 survey indicated that anglers were not harvesting as many 8 to 12-inch bass as before. Consequently, 8 to 12-inch bass were more abundant than ever before. Predation by bass had reduced bluegill and redear populations so much that panfishing opportunities were practically nonexistent. Again, it was recommended that the 12 to 15-inch slot limit stay in place to encourage bass harvest (Lehman 2004).

To rebuild the panfish population, 17,380 bluegill fingerlings ranging from 0.8 to 1.4 inches, and averaging 1.1 inch were stocked into the lake November 7, 2003 along with 11,947 redear sunfish fingerlings ranging from 1.1 to 1.5 inches and averaging 1.3 inch. A spot-check survey scheduled for the fall of 2004 to evaluate the panfish stockings was cancelled due to a fish kill at the lake in early August. Instead of a spot-check survey, a more complete fish management survey was conducted in the fall of 2004 to evaluate changes in the fish populations after the fish kill and to note any changes since the last survey of 2003.

METHODS

This survey was conducted on October 25 to 26, 2004. Some physical and chemical characteristics of the water were measured in the deepest area of the impoundment near the principal spillway. A vegetation survey was not conducted.

Fish were collected by driving a boat-mounted, pulsed DC electrofishing Smith-Root® unit with two dippers along a portion of the shoreline at night for 0.50 hour. One trap net and two experimental-mesh gill nets were also fished overnight. A GPS was used to record the location of the limnological data collection site and fish collection sites.

All fish collected were measured to the nearest 0.1 inch in total length. Average weights for fish by half-inch groups for Fish Management District 8 were used to estimate the weight of bluegill, largemouth bass, redear sunfish, hybrid sunfish, and white crappie in the sample. Other fishes were weighed in the field to the nearest 0.01 pound. Fish scale samples were taken from selected species for age and growth analysis. Electrofishing catch rates include all age groups of fish unless stated otherwise. Proportional stock density (PSD) values were calculated using fish caught by electrofishing.

RESULTS AND DISCUSSION

Buffalo Trace Lake is approximately 10 feet deep at normal pool. Sunlight penetration of the lake's gray green water, as measured with a Secchi disk, was 5.5 feet. Water temperatures and dissolved oxygen concentrations were similar at all depths indicating that fall turnover had occurred. Submersed vegetation appeared to be very scarce.

A total of 1,297 fish, representing 6 species and naturally occurring hybrid sunfish, was collected during this survey. Total weight of the fish sample was approximately 97 pounds.

Bluegill ranked first by number (67%) and second by weight (25%) in the survey sample. They ranged in length from 1.0 to 9.5 inches, averaging 2.9 inches. After a decrease in relative abundance by 76% from 1998 to 2003 (most likely due to a lack of escape cover and heavy predation; Lehman 2004), bluegill numbers increased from 25 in 2003 to 862 in 2004. Most of these bluegill (76%) were young-of-the-year; however, 17% of the bluegill collected were age 1 and likely represented those bluegill stocked in 2003.

Of the 862 bluegill in this sample, 10 (1%) were quality size fish (6.0 inches or longer). Not enough age 3 and older bluegill were collected to determine their age at 6.0 inches. Growth for age 1 and 2 bluegill is above average (Figure 1).

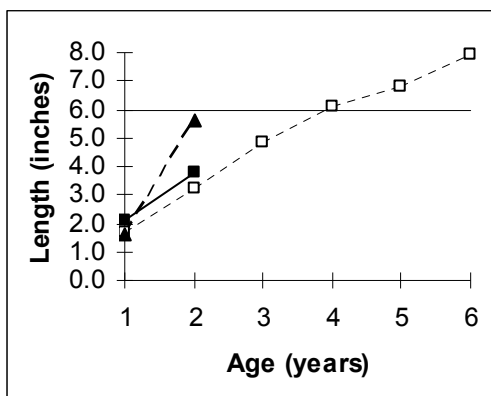


Figure 1. Buffalo Trace bluegill growth from 2004 survey (solid line) compared to 2003 survey (dashed line) and to average bluegill growth observed in Fish Management District 8 impoundments (dotted line). Quality size bluegill are 6.0 inches or longer.

Balanced bluegill populations exhibit PSD values that range from 20 to 60 (Anderson and Neumann 1996). The PSD value for Buffalo Trace bluegill is 8, which is well below the desired range and an 88% decrease from the 1998 PSD value of 66 (Lehman 1999). The current low PSD is due to an overabundance of 3 to 6-inch bluegill and a low number of bluegill 6 inches and longer. Insufficient numbers of bluegill were collected in 2003 to calculate a reliable PSD value and, therefore, should not be used in comparisons.

The Bluegill Fishing Potential Index (BFPI) is an objective rating system that was developed in Indiana to assess bluegill fishing in lakes and ponds (Ball and Tousignant 1996).

Out of a possible 40 points in the index, the current bluegill fishery scored 14 points, which is in the “fair” category (Table). Although the bluegill electrofishing catch rate is good, a very low PSD and a low number of bluegill over 8 inches are the reasons for the BFPI score in Buffalo Trace.

Table. Range of scores for each category in the bluegill fishing potential index.				
POOR	MARGINAL	FAIR	GOOD	EXCELLENT
0 - 7.0	7.1 – 12.9	13.0 - 18.9	19.0 – 25.9	26.0 - 40.0

Largemouth bass ranked second by number (20%) and first by weight (54%) in the sample. They ranged in length from 4.5 to 14.0 inches, averaging 7.0 inches. Compared to June 2003, the bass electrofishing catch rate increased by 70% and the number of bass collected increased by 78% (Lehman 2004). Approximately 4% of the bass were in the slot limit compared to approximately 9% in June 2003.

Bass growth has declined since 2003 (Figure 2). However, growth remains at or slightly above the average for southeastern Indiana. The average bass in southeastern Indiana requires four years of growth to enter the protection of the slot limit.

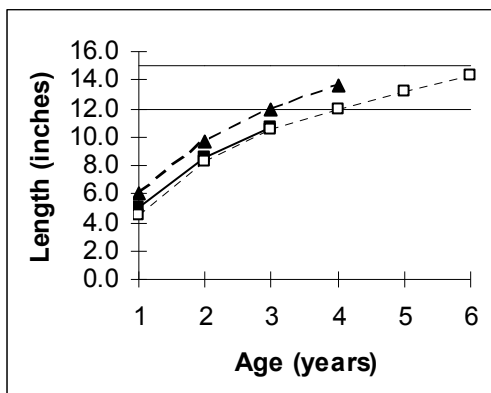


Figure 2. Buffalo Trace largemouth bass growth from 2004 survey (solid line) compared to 2003 survey (dashed line) and to average largemouth bass growth observed in Fish Management District 8 impoundments (dotted line). Slot limit is indicated by the horizontal lines at 12.0 and 15.0 inches.

Balanced largemouth bass populations exhibit PSD values that range from 40 to 70 (Anderson and Neumann 1996). The PSD value of 24 for Buffalo Trace bass is well below the range, but has improved by 116% compared to the 2003 value of 11 (Lehman 2004). The low PSD value of 24 indicates that the number of bass in the 8 to 12-inch group is much greater

than is desirable in a balanced bass population. Anglers are not harvesting enough of these small, legal bass.

A total of 120 redear sunfish, which ranged in length from 1.9 to 7.6 inches, was collected. This is a tremendous improvement when compared to 2003 when only 3 were collected (Lehman 2004). It appears that the redear stocking in November 2003 was very successful. Approximately 51% of the redear collected were age 1 and most of them most likely represent those redear stocked in 2003.

For this survey, redear sunfish growth for the first 2 years of growth is slightly greater than the average for southeastern Indiana (Figure 3).

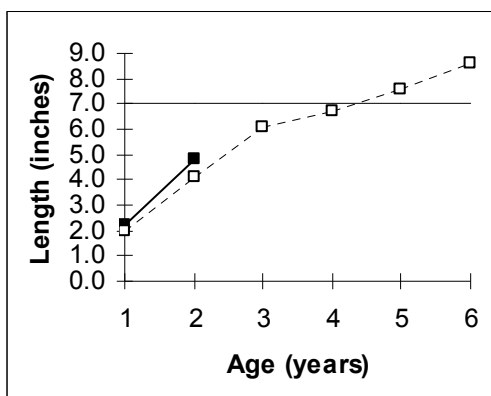


Figure 3. Buffalo Trace redear sunfish growth from 2004 survey (solid line) compared to average redear sunfish growth observed in Fish Management District 8 impoundments (dotted line). Quality size redear are 7.0 inches or longer.

White crappie ranked fourth by number (4%) in the survey sample. They ranged in length from 4.8 to 7.9 inches, averaging 6.8 inches. Of 47 white crappie collected, none were 8.0 inches or longer (quality size). Black crappie have not been collected in DFW surveys at Buffalo Trace since 1983. None of the dead fish observed in the fish kill were identified as crappie.

Six channel catfish were collected in two gill-net lifts which is similar to the catch rate of 3.5 catfish per lift observed in 2003 before the fish kill (Lehman 2004). Based on their length range of 12.7 to 17.5 inches, they should represent some of the catfish stocked in 2001 and 2003. Park personnel have indicated that channel catfish are very popular with anglers at this lake (Lehman 2004). The low number of channel catfish collected in this survey would seem to indicate good harvest by anglers as well as acknowledge some loss during the fish kill.

SUMMARY AND RECOMMENDATIONS

During a fish kill at Buffalo Trace Lake in early August 2004, 484 largemouth bass (8-10 inches), 149 bluegill (4-6 inches), 23 triploid grass carp (> 15 inches), 16 sunfish (6 inches), and

10 catfish (12 inches) were found dead. An additional 1,000 minnows, 40 catfish, 10 largemouth bass, and 10 bluegill were “rescued” and moved to another pond.

The current largemouth bass PSD of 24 is well below the acceptable range of 40 to 70. Even though 8 to 12-inch bass are still too abundant, the PSD has improved by 116% compared to the 2003 value of 11. It appears that the loss of 8 to 10-inch bass during the fish kill had a positive affect on the bass population and was able to accomplish something for the fishery that anglers were not doing. It is recommended that the 12 to 15-inch slot limit be maintained on largemouth bass at this time to encourage harvest of bass smaller than 12 inches.

The fish kill does not appear to have seriously affected bluegill and redear sunfish. Both species are now much more abundant than in June 2003 due to the large supplemental stockings of each in November 2003.

By 1995, grass carp had reduced the area of submersed aquatic vegetation to 1 acre which is much less than the 6 to 8 acres generally thought to be desirable in an impoundment being managed for bass and bluegill. Obviously, too many grass carp had been stocked in 1992. Although natural mortality had reduced grass carp numbers by 2004, submersed vegetation was still nearly completely absent, indicating grass carp were still too abundant. Thus, the death of 23 triploid grass carp is not a serious loss for the lake.

The loss of a few channel catfish in the fish kill does not negatively affect the catfishery. In light of angler interest in catfish, the DFW should continue to stock 725 channel catfish every 2 years as long as it is felt that channel catfish should be managed in this manner. Channel catfish should average at least 8 inches in length when stocked to reduce predation by bass.

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ACKNOWLEDGMENTS

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Submitted by: Larry L. Lehman, Fisheries Biologist
Date: November 21, 2006

Approved by: _____
Brian M. Schoenung, Fisheries Supervisor
Date: January 24, 2007

